UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,964	09/26/2005	Christoph Brabec	15626-037US1 SA-05US	3573

26161 7590 11/01/2006

FISH & RICHARDSON PC
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
COLEMAN, WILLIAM D	
ART UNIT	**PAPER NUMBER**
2823	

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

A

Office Action Summary	Application No.	Applicant(s)	
	10/524,964	BRABEC ET AL.	
	Examiner	Art Unit	
	W. David Coleman	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-6, 8-13 and 15-17 are rejected under 35 U.S.C. 102(a) as being anticipated by Camaioni et al., "Solar Cells Based on poly(3-alkyl)thiophenes and [60]fullerene: a comparative study", Journal of Materials Chemistry, The Royal Society of Chemistry, 2002, pp. 2065-2070.

2. Camaioni discloses a semiconductor process as claimed. Please read the entire document.

3. Pertaining to claim 1, Camaioni teaches a method for treating a photovoltaically active layer with a solvent and/or by annealing, characterized in that said photovoltaically active layer comes into contact with solvent molecules and/or is heated. (Please see pp. 2068 where Camaioni discloses that preliminary results indicate that a dramatic improvement of the device performance could be achieved after a mild thermal treatment of the cells before and after heating the device to about 55°C). {With respect to treating the photovoltaic active layer with a solvent, please note that the fullerenes in one example was dissolved in toluene, where Camaioni addresses a "methanolfullerene", pp 2066).

4. Pertaining to claim 2, Camaioni teaches the method as defined in claim 1, wherein said photovoltaically active layer is a polyalkylthiophene (see title) that is present in mixture with an additive such as a fullerene, particularly a methanofullerene (see the rejection of claim 1 above).

5. Pertaining to claim 3, Camaioni teaches the method as defined in either of claims claim 1 and, wherein said photovoltaically active layer is exposed to a solvent vapor (because the fullerene material and the organic semiconductor material are in solution form and the fullerene which is in solution form in toluene, Camaioni meets the claim limitations).

6. Pertaining to claim 4, Camaioni teaches the method as defined in claim 3, wherein said photovoltaically active layer is exposed to said solvent vapor at room temperature (Camaioni discloses fabricating photovoltaic cells at ambient room temperature and giving them a mild heat treatment, see Abstract).

7. Pertaining to claim 5, Camaioni teaches the method as defined in claim 1, wherein said photovoltaically active layer is exposed to said solvent vapor for no longer than one minute (the Examiner takes the position that since Camaioni is attaching a fullerene to the organic semiconductor material and heating the final product to about 55°C for 30 minutes).

8. Pertaining to claim 6, Camaioni teaches the method as defined in claim 1, wherein said solvent xylene, toluene, butanone and/or chloroform and/or a further solvent and/or an arbitrary mixture of said solvents at least partially etches or softens said polyalkylthiophene (because

Camaioni teaches forming photovoltaic cells incorporating poly(3-alkyl)thiophenes and fullerenes in a toluene process, it is inherent that the toluene in the Camaioni semiconductor process softens the said polyalkylthiophene material).

9. Pertaining to claim 8, Camaioni teaches a photovoltaic element comprising a photovoltaically active layer containing a polyalkylthiophene in mixture, wherein the photovoltaic photovoltaically active layer has an absorption maximum in the deep red region (please see FIG. 1 where the Examiner takes the position that Camaioni teaches that PBT (poly{3-butylthiophene}) has an absorption at about 550 and 600nm, see pp. 2067).

10. Pertaining to claim 9, Camaioni teaches a method of treating a photovoltaically active layer, comprising:

contacting the photovoltaically active layer with solvent molecules (please see the rejection of claim 1 above for explanation of the present claim rejection).

11. Pertaining to claim 10, Camaioni teaches the method as defined in claim 9, wherein the photovoltaically active layer comprises:

a polyalkylthiophene; and a fullerene mixed with the polyalkylthiophene (please see the rejection of claims 1, 8 and 9).

12. Pertaining to claim 11, Camaioni teaches the method of claim 10, wherein the fullerene comprises a methanofullerene.

13. Pertaining to claim 12, Camaioni teaches the method of claim 9, wherein the solvent comprises solvent vapor (it is well known that toluene is highly volatile with a high vapor pressure as compared to water (H_2O)).

14. Pertaining to claim 13, Camaioni teaches the method of claim 11, wherein the solvent vapor is at room temperature (because Camaioni teaches fabrication the photovoltaic cells at ambient temperature, this limitation has been met).

15. Pertaining to claim 15 Camaioni teaches the method of claim 9, wherein the solvent comprises at least one solvent selected from the group consisting of xylene, toluene, butanone, and chloroform (this claim has been addressed above).

16. Pertaining to claim 16, Camaioni teaches the method of claim 9, wherein the solvent at least partially etches or softens the polyalkylthiophene (this limitation has been addressed above).

17. Pertaining to claim 17, Camaioni teaches the method of claim 9, further comprising annealing the photovoltaically active layer(this is inherently done to remove the solvent from the photovoltaic film).

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

19. Claims 7, 14 and 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Camaioni et al., "Solar Cells Based on poly(3-alkyl)thiophenes and [60]fullerene: a comparative study", Journal of Materials Chemistry, The Royal Society of Chemistry, 2002, pp. 2065-2070.

20. Camaioni discloses a semiconductor process substantially as claimed. However, Camaioni fails to disclose the following limitations.

21. Pertaining to claims 7, 18 and 20, Camaioni fails to teach the method of claims 1 and 17, wherein the photovoltaically active layer is annealed at a temperature of at least 70°C. Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

"The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is

critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

22. Pertaining to claims 19, 21 and 22, Camaioni fails to teach the method of claims 1, 9 and 20 wherein, after treating, the photovoltaically active layer has an absorption maximum in the deep red region. Camaioni discloses the Absorption spectra of films which where spin-cast in chloroform. It would have been obvious to one of ordinary skill in the art that the shift to the deep red region is dependent on the solvent used. Specifically, the graph shows the solvent used as chloroform, it would have been obvious to exchange the chloroform with toluene to shift the spectra.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856. The examiner can normally be reached on Monday-Friday 9:00 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

W. David Coleman
Primary Examiner
Art Unit 2823

WDC